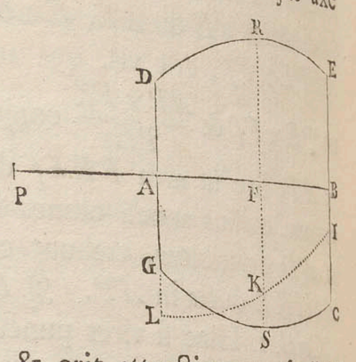
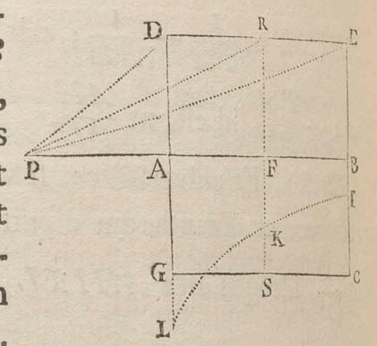
PROPOSITIO XCI. PROBLEMA XLV.

Invenire attractionem corpuſculi ſiti in axe ſolidi rotundi, ad cujus puncta ſingula tendunt vires æquales centripetæ in quacunque diſtantiarum ratione decreſcentes.

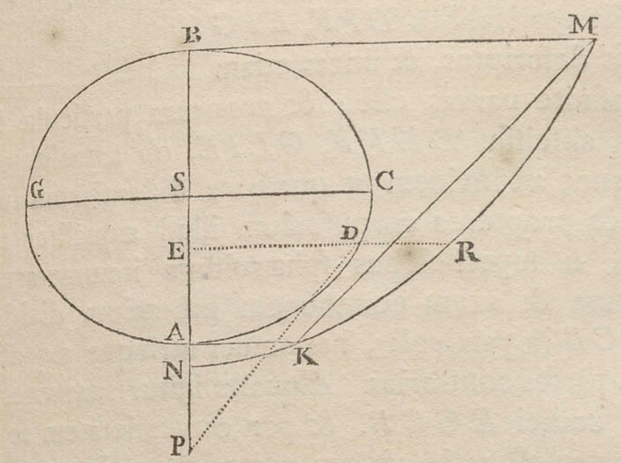
In ſolidum *DECG* trahatur corpuſculum *P*, ſitum in ejus axe *AB*. Circulo quolibet *RFS* ad hunc axem perpendiculari ſecetur hoc ſolidum, & in ejus ſemidiametro *FS*, in plano aliquo *PALKB* per axem tranſeunte, capiatur (per prop. xc.) longitudo *FK* vi, qua corpuſculum *P* in circulum illum attrahitur, proportionalis. Tangat autem punctum *K* curvam lineam *LKI*, planis extimorum circulorum *AL* & *BI* occurrentem in *L* & *I*; & erit attractio corpuſculi *P* in ſolidum ut area *LABI*. *Q. E. I.*



Corol. 1. Unde ſi ſolidum cylindrus ſit, parallelogrammo *ADEB* circa axem *AB* revoluto deſcriptus, & vires centripetæ in ſingula ejus puncta tendentes ſint reciproce ut quadrata diſtantiarum a punctis: erit attractio corpuſculi *P* in hunc cylindrum ut $AB - PE + PD$. Nam ordinatim applicata *FK* (per corol. 1. prop. xc.) erit ut $1 - \frac{PF}{PR}$. Hujus pars 1 ducta in longitudinem *AB*, deſcribit aream $1 \times AB$: & pars altera $\frac{PF}{PR}$ ducta in longitudinem *PB*, deſcribit aream 1 in $\overline{PE - AD}$, id quod ex curvæ *LKI* quadratura facile oſtendi poteſt;) & ſimiliter pars eadem ducta in longitudinem *PA* deſcribit aream 1 in $\overline{PD - AD}$, ductaque in ipſarum *PB*, *PA* differentiam *AB* deſcribit arearum differentiam 1 in $\overline{PE - PD}$. De contento primo $1 \times AB$ auferatur contentum poſtremum 1 in $\overline{PE - PD}$, & reſtabit area *LABI* æqualis 1 in $\overline{AB - PE + PD}$. Ergo vis, huic areæ proportionalis, eſt ut $AB - PE + PD$.



Corol. 2. Hinc etiam vis innoteſcit, qua ſphærois *AGBC* attrahit corpus quodvis *P*, exterius in axe ſuo *AB* ſitum. Sit *NKRM* ſectio conica cujus ordinatim applicata *ER*, ipſi *PE* perpendicularis, æquetur ſemper longitudini *PD*, quæ ducitur ad punctum illud *D*, in quo applicata iſta ſphæroidem ſecat. A ſphæroidis verticibus *A*, *B* ad ejus axem *AB* erigantur perpendicula *AK*, *BM* ipſis *AP*, *BP* æqualia reſpective, & propterea ſectioni conicæ occurrentia in *K* & *M*; & jungatur *KM* auferens ab eadem ſegmentum *KMRK*.



Sit autem ſphæroidis centrum *S* & ſemidiameter maxima *SC*: & vis, qua ſphærois trahit corpus *P*, erit ad vim, qua ſphæra diametro *AB* deſcripta trahit idem corpus, ut $\frac{AS \times CSq - PS \times KMRK}{PSq + CSq - ASq}$ ad $\frac{AS\ cub.}{3PS\ quad.}$. Et eodem computandi fundamento invenire licet vires ſegmentorum ſphæroidis.

Corol. 3. Quod ſi corpuſculum intra ſphæroidem in axe collocetur; attractio erit ut ipſius diſtantia a centro. Id quod facilius hoc argumento colligitur, ſive particula in axe ſit, ſive in alia quavis diametro data. Sit *AGOF* ſphærois attrahens, *S* centrum ejus, & *P* corpus attractum. Per corpus illud *P* agantur tum ſemidiameter *SPA*, tum rectæ duæ quævis *DE*, *FG* ſphæroidi hinc inde occurrentes